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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Kyoung-Il Park

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EXAMINER

LIBENZON, ILYA I

ART UNIT

PAPER NUMBER

1712

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/591,059	Applicant(s) PARK ET AL.	
	Examiner ILYA I. LIBENZON	Art Unit 1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/30/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/30/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/6/2010, 8/30/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Droski (US 6,811,806) in view of Orii et al. (US 5,092,959).

Regarding **claim 1, 7, and 8**, Droski is directed towards an apparatus for spraying an atomized liquid compound onto a sheet material (abstract). The apparatus includes a fluid heater 40 (Fig.1, Col.4, lines 16-18), two spray nozzles 184 (Fig. 4, Col.6 lines 52-54) adapted to place liquid from lines 178 in direct communication with a heated gas to atomized the liquid compound that is forced to exit nozzle 184 as a spray (Col.6, lines 54-64), thus nozzles 184 are capable of spraying the instantly claimed catalyst solutions, and heated airline 174 (Fig. 4, Col.6, line 50).

What Droski does not disclose is a heater for heating a carrying gas.

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Orii, directed towards a spray dryer device for spray drying a sample dissolved in an organic solvent (abstract), discloses a circulating line 1 with an inert gas, such as nitrogen gas (**claim 8**), is circulated, and heater 8 (Fig. 1, lines 45-50) that is capable of heating the carrying gas at a temperature higher than the boiling points of the catalyst solutions (**claim 7**). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the references, specifically to have supplied the heated air line of Droski with a heater of Orii for heating a carrying gas, because Orii teaches that providing a heater to a heated air line is a recognized technique in the art.

Regarding **claim 3**, Droski discloses one fluid heater 40 (Fig.1). It would have been obvious to one of ordinary skill in the art to employ two heaters, one for each solution as instantly claim, thus making separable heaters a matter of obvious engineering choice. In re Dulberg, 289 F.2d 522.

Regarding **claim 2, 4, and 5**, Droski desires that a temperature of a solution reached 180°F (Col.8, lines 20-21), thus a fluid heater 40 (Fig. 1) is necessarily capable of heating a solution at a temperature in a range of $0.6 \times BP$ to $0.95 \times BP$, where BP is a boiling point of a solvent of the catalyst solution.

4. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Droski (US 6,811,806) in view of Orii et al. (US 5,092,959), as applied to claim 1-5 and 7-8, and further in view of Toru (JP410113602A).

Droski in view of Orii discloses nozzles but does not specifically teaches that the nozzles are configured to operate to alternately spray the solution. Toru, however,

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discloses an apparatus for spray coating (abstract) having two nozzles that are controlled by a spray signal with set discharge time and discharge intervals set in advance for each nozzle and that can spray alternately (abstract, Fig. 1) to improve coating efficiency.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the references, specifically to have practiced the spraying apparatus of Droski in view of Orii equipped with an alternately spraying system of nozzles desired by Toru with the motivation to improve coating efficiency.

5. **Claim 9, 10, 11, and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yan et al. (US 2005/0163920) in view of Huang et al. (US 2003/0186109), Goode et al. (US 3,391,986), and Toru (JP410113602A).

Regarding **claim 9**, Yan, directed towards a method of manufacturing a membrane electrode assembly for a fuel cell (abstract), teaches a process that comprises forming an anode 22 by spraying catalyst ink 18 through a suitable nozzle 20 (could incorporate airbrush gun) onto the membrane 14 to form a catalyst layer 12 (Fig. 1, [0025]), drying the catalyst layer 12 with the heat lamp 30 [0026], and then forming a cathode 26 by spraying catalyst ink 18 onto the other side of membrane 14 with subsequent drying by the heat lamp 30 [0027]. Yan teaches using airbrush gun, but does not specifically teach a carrying gas.

Huang, directed at the method of manufacturing membrane electrode assembly by depositing a nano-structured catalyst coating onto electrode for fuel cell applications

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(abstract), teaches heating and at least partially vaporizing the catalyst material and introducing a stream of a carrier gas, such as argon or helium [0014], into the chamber to carry catalyst to deposit onto a first side of the electrode substrate [0009].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the references, specifically to have practiced the method of Yan with a carrying gas of Huang, for Huang teaches that use of a noble gas as a carrier gas is a recognized technique in the art of manufacturing a membrane electrode assembly.

Yan in view of Huang does not teach preheating carrying gas. Goode is directed towards a process of controlling polymerization process parameters through catalyst droplets used in the process (technical field). It teaches that prior to exiting spray nozzle, the temperature of a catalyst solution and carrier gas can be individually controlled (Col. 3, lines 1-10) in order to control the temperature of the droplets and to ensure more efficient liquid catalyst spray delivery (Col. 1, lines 36-38).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the references, specifically to have practiced the process of Yan in view of Huang while employing preheating of the gas and catalyst solution as per teaching of Goode with the motivation to ensure more efficient liquid catalyst spray delivery.

Yan in view of Huang and Goode does not disclose an application of two different nozzles. Toru, directed at the spray coating method of improved coating efficiency, discloses a spray coating method in which two spray nozzles 2 are used to apply paint

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to a material to be coated, wherein said nozzles are configured to spray alternately (abstract, Fig. 1). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the references, specifically to have practiced the membrane fabrication process of Yan in view of Huang and Goode while coating an anode and cathode of membrane electrode using two nozzles as per Toru teaching, with the motivation to achieve improved coating efficiency.

Regarding **claim 10**, as discussed above, Toru teaches that the spraying from two nozzles can be performed alternately (abstract, Fig. 1), and it would have been obvious to supply the carrying gas to one of the nozzles that is not spraying the solution to decrease processing time, hence increase coating efficiency.

Regarding claim **11 and 12**, Goode, as discussed above, teaches that in order to control the temperature of droplets (Col.2, lines 65-67), the temperature of the solution can be controlled prior to mixing (Col. 3, lines 1-10), and it was held that "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454.

6. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yan et al. (US 2005/0163920) in view of Huang et al. (US 2003/0186109), Goode et al. (US 3,391,986), Toru (JP410113602A), as applied to claim 9-12, and further in view of Kondo et al. (US 2004/0126147).

'920 in view of '109, '986, and '602 does not teach that the carrying gas is heated at a temperature higher than the boiling points of the catalyst solutions. Kondo, directed

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towards a method for developing an electrostatic latent image (abstract), teaches that in order to remove an organic solvent from the prepared emulsion, the temperature of the system is increased to completely evaporate the solvent in the liquid drop, heating gas flows to a temperature higher than the boiling point of solvent to obtain particles of a target quality [0154].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the references, specifically to have practiced the process of membrane electrode assembly of '920 in view of '109, '986, and '602, while heating the carrying gas at a temperature higher than the boiling points of the solutions as taught by Kondo with the motivation to obtain coating having particles of a target quality.

Conclusion

7. All the claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ILYA I. LIBENZON whose telephone number is (571)270-3822. The examiner can normally be reached on Mn-Thurs 7:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571)272-0807. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A Chriss/
Primary Examiner, Art Unit 1786

/ILYA I LIBENZON/
Examiner, Art Unit 1712